



# Test Resource Management Center

*FY 2006 ANNUAL REPORT*

JANUARY 2007

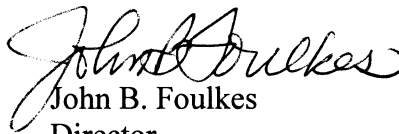
## Director's Foreword

In December 2004, I had the privilege of being selected as the first Director of the Department of Defense (DoD) Test Resource Management Center (TRMC). Because I have an extensive background in test and evaluation (T&E), I understood the necessity of full and rigorous testing of any system before placing it in the hands of our fighting men and women. I knew from experience the importance of the Department's test infrastructure inherent in our test centers and ranges. Thus, I began my tenure with the firm conviction that a healthy and vibrant T&E infrastructure is essential to assist the acquisition community in producing quality weapon systems.

I am committed to providing the Under Secretary of Defense for Acquisition, Technology, and Logistics and the entire Research, Development, Test, and Evaluation community with a robust test infrastructure that supports timely testing to meet our weapon systems acquisition needs. This requires that we adequately maintain and systematically improve our T&E infrastructure.

This is my first annual report that covers our FY06 activities. It allows me to communicate with my two principal customers, senior DoD and Service decision makers and program managers, on how we are doing in pursuit of this objective. Further, it gives me the opportunity to articulate the TRMC's accomplishments over the last fiscal year and indicate where we are headed next year.

I am proud of the many significant accomplishments that the TRMC achieved this past year. However, we still have much work to do. We face many challenges in improving and maintaining the quality of the T&E infrastructure and, ultimately, the quality of testing. Ensuring that we have a T&E infrastructure that provides adequate testing time to meet a program's schedule is critically important to the entire acquisition community. I am honored to have the opportunity to be a part of this effort.



John B. Foulkes  
Director

## Table of Contents

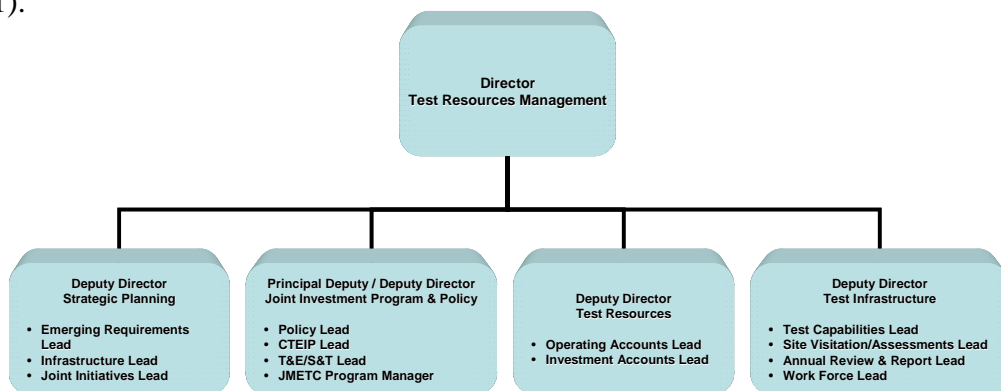
|   |           |
|---|-----------|
| <b>1. Introduction</b>  | <b>1</b>  |
| <b>2. Mission, Goals, and Vision</b>                            | <b>2</b>  |
| <b>3. State of the T&amp;E Infrastructure</b>                   | <b>4</b>  |
| <b>4. FY 06 Accomplishments and FY 07 Plans</b>                 | <b>8</b>  |
| 4.1 Strategic Planning .....                                    | 8         |
| 4.2 Test Resources .....  | 9         |
| 4.3 Investment Programs.....                                    | 12        |
| 4.4 MRTFB Policy .....  | 16        |
| 4.5 T&E Work Force Study .....                                  | 16        |
| 4.6 Oversight.....  | 17        |
| 4.7 NASA Collaboration.....                                     | 18        |
| 4.8 Modeling and Simulation.....                                | 19        |
| <b>5. Test and Training Collaboration:</b>                      | <b>19</b> |
| 5.1 Range and Installation Sustainment .....                    | 20        |
| 5.2 Test and Training Planning Collaboration within OSD .....   | 20        |
| 5.3 MRTFB Training Support .....                                | 21        |
| 5.4 Collaboration with JFCOM .....                              | 21        |
| 5.5 Joint Infrastructure Enterprise Initiative (JIEI) .....     | 21        |
| <b>6. New FY 07 Initiatives</b>                                 | <b>22</b> |
| 6.1 Range Capability Directory (Inventory infrastructure) ..... | 22        |
| 6.2 MRTFB Performance Metrics Development.....                  | 22        |
| <b>7. Summary</b>   | <b>23</b> |

# 1. Introduction

This report is the first of what will be an annual presentation of accomplishments and pending actions by the recently established Department of Defense (DoD) Test Resource Management Center (TRMC) to plan for and assess the adequacy of the Major Range and Test Facility Base (MRTFB); to provide adequate testing in support of development, acquisition, fielding, and sustainment of defense systems; and, to maintain awareness of other T&E facilities and resources, within and outside the Department. Although not mandated by law or regulation, this report provides an opportunity to articulate, informally, how the TRMC directly supports the research, development, and acquisition communities across DoD and, ultimately, the individual soldier, sailor, airman, and marine as they go into harm's way.

Since this is the first report, a little background on the genesis of the organization is in order. The December 2000 Defense Science Board's review of DoD's major range and test facilities entitled "Task Force on Test and Evaluation Capabilities" identified a number of issues regarding inadequate funding, management, and support of these test ranges and facilities, collectively known as "T&E infrastructure." To address these issues, Congress, via the National Defense Authorization Act of 2003, directed the Secretary of Defense (SecDef) to establish a DoD-level resource management organization. Title 10, United States Code, Section 196, DoD Directive (DoDD) 5105.71 established the TRMC as a DoD field activity under the authority, direction, and control of the USD(AT&L) to: (1) review and provide oversight of proposed DoD budgets and expenditures for T&E facilities and resources; (2) develop a biennial Strategic Plan reflecting the needs of DoD with respect to T&E facilities and resources; (3) review the Services' proposed T&E budgets for adequacy and certify that they are in compliance with the Strategic Plan; (4) administer the Central Test and Evaluation Investment Program (CTEIP) and the Test and Evaluation/Science and Technology T&E/(S&T) program.

The TRMC is currently organized into four divisions to support these congressional mandates (Figure 1).



**Figure 1.** TRMC Organization and Functions

The Strategic Planning Division, Test Resources Division, Joint Investment Programs and Policy Division, and Test Infrastructure Division focus on the four core business areas comprising TRMC's mission. The Strategic Planning Division is the architect of the biennial Strategic Plan and the off-year addendum.



The Joint Programs and Policy Division provides program management for the Central Test and Evaluation Investment Program (CTEIP), T&E/S&T, and Joint Mission Environment Test Capability (JMETC) programs as well as T&E infrastructure policy. The Test Resources Division, through two distinct operating elements, provides the annual certification of the Service's T&E budgets as well as a program of audits and assessments designed to assist the Services and Defense Agencies in maintaining the T&E infrastructure. The T&E Infrastructure Division, formally established on January 3, 2007, provides oversight of the overall T&E infrastructure (people, processes, and things). For cross-division issues requiring a concentrated effort, the TRMC forms integrated teams drawing from various business areas and specialties.

The Congress recognized the need for T&E capabilities not just across the military Services, but also extending to the defense agencies and other entities outside the DoD. The goal, as Congress saw it, was to have a healthy T&E infrastructure capable of supporting the development of complex weapon systems not only in a technical environment but also in a joint, operationally-realistic environment. The infrastructure should be global in nature, adaptive to multiple missions, persistent across the acquisition lifecycle, integrated across the spectrum of test capability areas, and distributable among the various sites and locations required by our customers. With this principle in mind, the TRMC has set out to guide the development of the infrastructure—not just facilities and property, but also the processes, paradigms, workforce, and skill sets—required to fulfill our mission and vision. As such, TRMC is the "steward of the T&E infrastructure."

## **2. Mission, Goals, and Vision**

The TRMC's mission, as stated in DoDD 5105.71, is to "plan for and assess the adequacy of the... MRTFB... [and] to provide adequate testing in support of development, acquisition, fielding, and sustainment of defense systems; and, maintain awareness of other T&E facilities and resources, within and outside the Department, and their impacts on DOD requirements."

From that mission, the Director established TRMC's Vision and Goal. These are directly derived from and linked to those goals set forth by the USD(AT&L) for the organization (Figure 2). Specifically, TRMC's Vision and Goal directly support several of the AT&L goals (Goal 1, 2, 3, and 6). The TRMC's six established performance outcomes are further subdivided into 29 performance objectives that support the TRMC Goal.

The TRMC has made great strides over the past year in accomplishing the 29 performance objectives. TRMC performed as expected, and products were successfully delivered with some processes still being refined and perfected, and some paradigms still being formed. Some notable examples include: publication of the FY05 Strategic Plan for DoD Test and Evaluation Resources and a FY06 addendum; initiation of a major MRTFB policy review; initiation of a DoD wide T&E investment review process; completion of the first phase of a demographics workforce study; transition of the JMETC Program Office to TRMC, and the successful certification of the Services' FY06 T&E budgets.

Some actions we initiated are not yet completed, and some products continue to be delivered. Examples of this include fully aligning the T&E/S&T and CTEIP programs with the TRMC Strategic Plan, solidifying a DoD-wide T&E Investment Review Process, and establishing a performance measurement process with associated metrics to assess the health and viability of the MRTFB.

**Vision:**

The DoD T&E ranges and facilities will be fully capable of supporting the Department with quality products and services in a responsive and affordable manner.

**Goal to Achieve the Vision:**

Robust and flexible T&E capabilities to support the warfighter

**Outcomes (Objectives):**

- 1. Comprehensive corporative strategic planning process for development and sustainment of future test capabilities**
  - a. Develop and publish FY05 Strategic Plan (and off-year addendum)
  - b. Refine strategic planning process to complete plan by June
  - c. Reconcile the 4 top capability gaps
  - d. Develop strategy to address gaps
  - e. Conduct 1 study in a critical area (e.g. threat systems, nuclear weapons effects)
- 2. Effective oversight of the MRTFB and other T&E facilities within and outside of the DoD, and administration of T&E investment programs**
  - a. Transition management and oversight of the JMETC program to TRMC, establish a Program Office, and demonstrate a prototype capability
  - b. Begin MRTFB re-engineering effort (Revising DoDD 3200.11)
  - c. Ensure S&T focus areas are addressing identified needs and continue to initiate and field CTEIP
  - d. Complete DoD study on National Aeronautics and Space Administration (NASA) Aeronautics facilities
  - e. Establish initial steps to create DoD/NASA governance mechanism
- 3. Better business practices ensuring sufficient investment to sustain critical test infrastructure**
  - a. Align T&E/S&T and CTEIP programs with Strategic Plan
  - b. Develop and publish FY06 Budget Certification report
  - c. Establish an annual DoD-wide T&E investment review process
  - d. Improve quality of data for T&E budget certification
  - e. Conduct charge policy compliance assessments on at least 3 MRTFB locations
  - f. Assess current T&E-related military construction (MILCON) projects and associated submission process to determine degree of TRMC involvement
- 4. An enduring, agile, multi-disciplinary T&E workforce**
  - a. Characterize the DoD T&E workforce
  - b. Identify workforce, training and education requirements
  - c. Develop a strategy for addressing workforce shortfalls
- 5. Improve integration of Test & Training capabilities, including range sustainment**
  - a. Obtain a leadership role in the sustainable range effort
  - b. Assist in the revision of the DTTSG charter
  - c. Identify strategies for planning and governance of ranges and infrastructure with the Office of the Secretary of Defense (OSD), the Joint staff, Joint Forces command (JFCOM) and the Services
- 6. Effective TRMC organizational operations**
  - a. Establish a culture of performance management throughout the organization
  - b. Establish an internal manpower requirement, budget, financial management and tracking process
  - c. Establish our own support contracts and align chronologically
  - d. Fill all remaining government billets, obtain Joint Duty accreditation for military, sponsor at least 2 rotational training assignment personnel
  - e. Conduct at least 2 dedicated range visits
  - f. Plan and support Test Week 2006 conference
  - g. Develop a TRMC logo and working website

**Figure 2. TRMC Vision, Goal, and Outcomes (Objectives) for FY 2006**

### 3. State of the T&E Infrastructure

Congress, recognizing the need for a comprehensive assessment and analysis of the DoD T&E capabilities supporting the warfighter, gave TRMC the responsibility for strategic planning within the DoD T&E infrastructure. This ensures that appropriate investments are being made into needed capabilities on our test ranges and facilities. To assess the current state of the infrastructure and be able to measure our progress towards building needed capability, TRMC recognized the need to characterize the state of the T&E infrastructure.

In order to optimally support weapon system development, acquisition, improvements, and shelf-life surveillance as they advance through their life cycles, we encourage a test process that entails the sequential use of six Test Resource Categories depicted in Figure 3. As a weapon system matures through design, development, demonstration, and acquisition (Time axis), these test resource capabilities provide the optimum in fidelity for the lowest cost per data point; i.e., a higher number of test trials can be achieved for lower costs to the left of the Figure. In this process, while the relative cost of testing increases as the higher fidelity test resource capability to the left is used, even more dramatically (notionally) is the increase in cost to an acquisition program in terms of time and schedule to fix any deficiencies that are not uncovered early in the test process (to the right). It is key that the test resource capabilities to the left be used extensively to discover any design deficiencies early in the weapon system development before the cost to perform tests and to fix design deficiencies impacts the acquisition program cost and schedule.

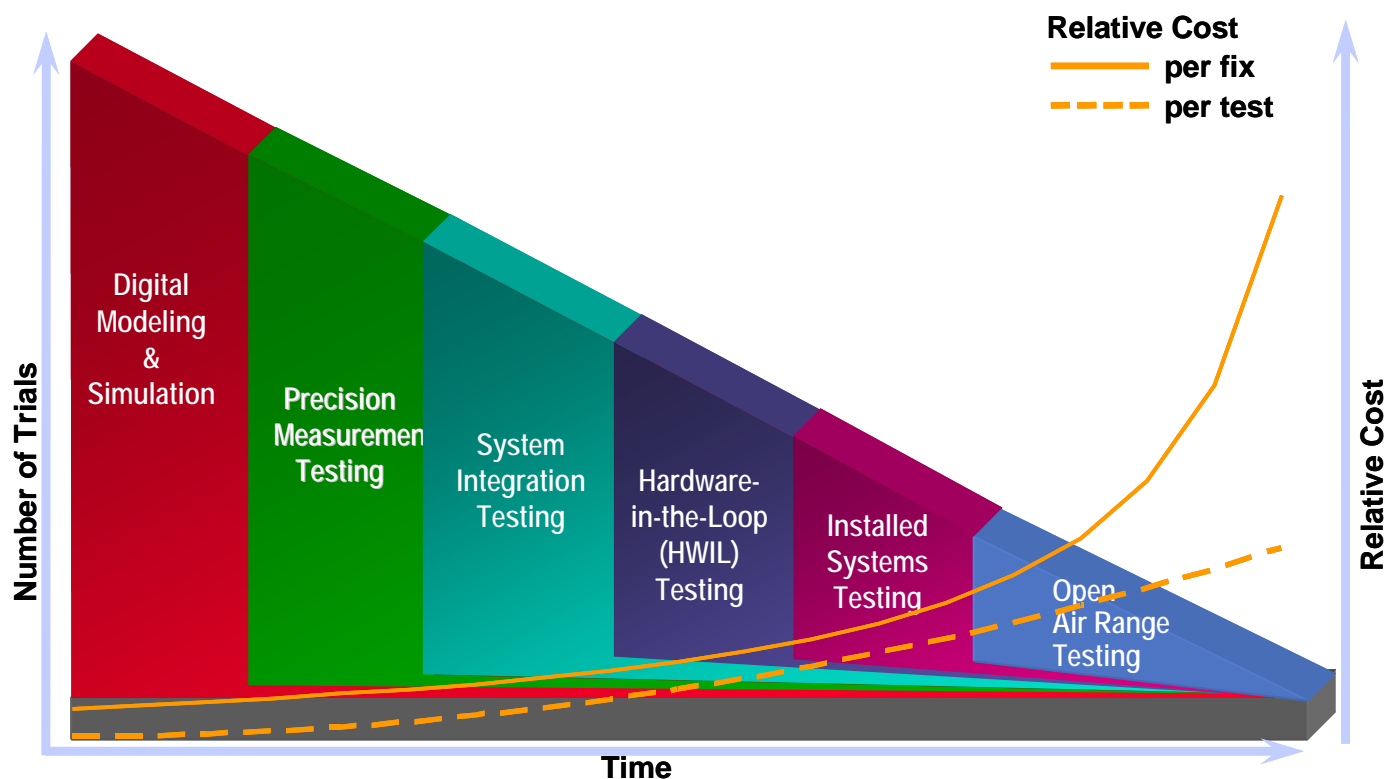


Figure 3. DoD T&E Process

In this model of the test process, the Test Resource Categories are as follows:

- **Simulation Facility (DMS):** Design concepts are tested using digital modeling and simulation facilities that provide the largest number of trials at the least cost per trial: simulation facilities include digital models and simulations, and manned simulators (such as cockpit simulators), and may be stand-alone or networked with live, virtual, and constructive simulations.
- **Integration Laboratory (IL):** As hardware (components, subsystems) is being developed, precision measurement facilities provide a controlled and measurable environment (indoors or outdoors) for precise technical measurement of unique characteristics of a system, sub-system, or component. They include radar cross-section measurement facilities, wind tunnels, space chambers, live fire test and evaluation facilities, sled tracks, and propulsion test cells.
- **Measurement Facility (MF):** As integration of subsystems of software and hardware system components occur, system integration laboratories measure the interaction of those subsystems and components with each other and with other systems and environments.
- **Hardware in the Loop (HITL) Facility:** Used to evaluate actual or proposed system hardware elements by examining the performance of those elements during the acquisition phases of Concept Refinement, Technology Development, and System Development and Demonstration phases before an entire weapon system is available.
- **Installed System Test Facility (ISTF):** As a weapon system matures to the point of open-air testing, installed-system test facilities provide capabilities to evaluate developing systems installed on, and integrated with, their intended host platform, as well as to test the whole platform in a controlled environment.
- **Open Air Range (OAR):** The most expensive testing per trial, but most realistic, is accomplished on open-air ranges: i.e., specifically bounded or designated geographic areas/volumes that encompass a landmass, body of water (above and/or below surface), and/or airspace; and the associated instrumentation, communications, threat systems, targets, workforce, and other elements of a physical plant used to measure and collect data in that environment.

The adequacy of the T&E infrastructure is based on having or having programmed test resource capabilities with sufficient capacity to be available when needed in each of the six Test Resource Categories of the DoD test process described above for each Test Capability Area as described below:

- **Air Combat:** Addresses test capabilities for development and use of fixed-wing and/or rotary-wing manned and unmanned aircraft and all related air operations mission and support systems throughout the system life cycle. It also includes aircraft stores compatibility, aerial delivery, subsystems or functions, and software changes/updates.
- **Armaments and Munitions:** Addresses test capabilities for development and use of torpedoes, mines/countermines (land and sea), bombs, missiles, guns, rockets, grenades, ammunition, non-lethal methods, directed energy and high power microwave weapons, air-launched ASW/subsurface target projectiles and countermeasures, and endo- and exo-atmospheric kill weapons.



- **Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR):** Addresses test capabilities for development and use of information technology for achieving a network-centric warfare capability that enables networking sensors, decision makers, and shooters. It includes: information security, information assurance, information operations and warfare, frequency spectrum management and control, and effectively linking knowledgeable entities in the battlespace.
- **Common Range Instrumentation:** Addresses classes of basic test support capabilities that are common to the technical sustainability of test facilities associated with open-air test ranges, and are not specific to a particular location or Test Capability Area.
- **Electronic Combat (EC):** Addresses test capabilities to deny, degrade, disrupt, and destroy any adversary by electromagnetic means. Includes the recognized electronic warfare mission areas of Electronic Attack (EA), Electronic Protection (EP) and Electronic Warfare Support (ES) to enhance the warfighter effectiveness in achieving "full spectrum dominance" across the entire electromagnetic spectrum.
- **Land Combat:** Addresses test capabilities for land systems for both mounted and dismounted warriors, as well as urban operations, and robotic support systems. Includes platform and sub-system technologies such as battlefield digitization, propulsion and power, track and suspension, chassis and turret structures, vehicle subsystems, dynamics, integrated survivability, fuels and lubricants, and integration technologies as related to land vehicles.
- **Sea Combat:** Addresses test capabilities involving the ships (surface and subsurface), manned and unmanned sea-mobile vehicles, shipboard systems, and land and air-based systems that support or function as extensions of shipboard systems.
- **Targets and Threats:** Addresses test capabilities for stressing weapon systems in the presence of real world threats represented in a variety of forms, including threat representative targets, threat simulators, actual foreign threat weapon system components, and digital threat models.
- **Test Environments:** Addresses indoor or outdoor facilities that replicate the physical conditions needed for development of current and future military systems across all Test Capability Areas. This includes direct simulation of the test environment or replication of the salient physical phenomenon.

The following spotlight chart (Figure 4) provides a quick look at the health and well-being of the DoD T&E infrastructure based on information presented in the TRMC 2005 Strategic Plan and the 2006 addendum for T&E.

With the exception of the open-air range test resource category, the Services and Defense Agencies are adequately resourcing identified shortfalls or requirements in a manner timely enough to support weapon systems development. The open-air range test resource category has several red and red/yellow ratings due primarily to 2 critical gaps identified in the 2005 Strategic Plan: full-scale aerial target (FSAT) replacement and a supersonic anti-ship cruise missile (ACSM) target. Since the writing of the 2005 Strategic Plan and the 2006 addendum, the USD, Program Analysis & Evaluation (PA&E) has instructed the Air Force to fund the development of a replacement for the current QF-4 FSAT. However, the relative short time available to build and qualify a new target without restricting testing continues to be a concern. Absence of a

credible Navy Threat-D ASCM test capability remains an open test adequacy concern. Senior DoD leadership recently decided to withhold funding to develop a Threat-D target pending further study of other test capability approaches. As a result, the Navy is now leading a technical analysis of alternative Threat-D design solutions, and will brief the results to the DepSecDef in late April 2007.

| Test Capability Areas        | Test Resources Categories |    |    |      |       |     |
|------------------------------|---------------------------|----|----|------|-------|-----|
|                              | DMS                       | IL | MF | HITL | ISTFs | OAR |
| Air Combat                   |                           |    |    |      |       |     |
| Armaments & Munitions        |                           |    |    |      |       |     |
| C4ISR                        |                           |    |    |      |       |     |
| Common Range Instrumentation |                           |    |    |      |       |     |
| Electronic Combat            |                           |    |    |      |       |     |
| Land Combat                  |                           |    |    |      |       |     |
| Sea Combat                   |                           |    |    |      |       |     |
| Space Combat                 |                           |    |    |      |       |     |
| Test Environment             |                           |    |    |      |       |     |
| Targets & Threats            |                           |    |    |      |       |     |

#### Definitions

DMS - Digital Modeling and Simulation  
 IL - Integration Lab  
 MF - Measurement Facility  
 HITL - Hardware-in-the-Loop  
 ISTF - Installed Systems Test Facility  
 OAR - Open-Air Range

|                                    |        |
|------------------------------------|--------|
| Not identified as a T&E gap        | Green  |
| Identified as a lower tier T&E gap | Yellow |
| Identified as a critical T&E gap   | Red    |

**Figure 4. T&E Infrastructure Assessment**

The need for a more robust capability in Chemical/Biological testing, Hypersonics testing, and Electronic Combat threat models and simulations influence other areas of this chart coded as a red/yellow mix. Although the Chemical/Biological programs driving new test capability development appear to have adequate funding, timeliness and the risk of developing a non-representative environment remain concerns of TRMC. Hypersonic testing continues to present many challenges to the T&E community, not the least of which is the very large amount of range space needed to test vehicles. Other factors which drive these ratings to yellow/red are insufficient instrumentation of ranges and vehicles to gather telemetry and time, space, position information (TSPI) data as well a lack of sufficient capability in measurement facilities to test the supersonic to hypersonic transition for engines and engine components. The need to continuously update our test ranges and facilities with systems that accurately represent the intelligence communities' evolving assessment of current and emerging threat capabilities presents a unique challenge. Access to foreign material solutions is uncertain, so there is a need for increased investment to develop threat simulators that represent next-generation missile threats. Likewise, there is a need for greater standardization of threat fly-out models better correlate results of survivability and electronic warfare testing performed in ISTFs, HITLs, and OARs.

While this stoplight chart attempts to depict a snapshot view of T&E across the DoD, TRMC recognizes that there is some ambiguity about the placement of specific test capabilities into the test capability areas. The TRMC, in its oversight role, assesses these areas that cross services or test capability areas and makes recommendations to the Services and Defense Agencies as the needs arise.

## **4. FY 06 Accomplishments and FY 07 Plans**

This year saw the completion of building the organization's staff and organizing the office into a fully functional force, focused on fulfilling the congressional mandate of overseeing the T&E infrastructure and developing programs to guide and help the Services and Defense Agencies in this endeavor. Additionally, during this period, the responsibility for T&E infrastructure policy and oversight, as well as the responsibility for the T&E investment programs, transferred successfully from DOT&E to TRMC. The TRMC is working proactively and collaboratively with the Services and Defense Agencies to better the overall T&E infrastructure.

### **4.1 Strategic Planning**

To help achieve the vision for future T&E infrastructure, TRMC employs a comprehensive corporate strategic planning process for development and sustainability of future test capabilities. The TRMC reports to Congress every two years with a Strategic Plan.

To provide the most accurate basis possible for the budget assessment, TRMC internally implemented and off-year review and published an addendum in August 2006. The addendum reflects new analysis and provides updated investment roadmaps, which reflect changes that may have occurred since the last publication of the Strategic Plan, providing an updated baseline to assist in the annual budget certification process. TRMC will not report the updated addendum produced in the off-year to Congress.

The TRMC developed the Strategic Plan through collaboration with the Services and Defense Agencies via a strategic planning working group (SPWG). The strategic planning process identified several dominant T&E themes and focus areas. These include the ability to test emerging new technology systems, such as directed energy systems, unmanned systems, hypersonic weapon systems, weapon systems that require a larger footprint, and information warfare non-kinetic systems. The T&E community challenge is to evolve test capability to enable tests in the context of sensor-to-shooter kill chains, joint mission threads that integrate weapon and C4ISR systems using joint tactics, and doctrine that crosses Service and allied partners' boundaries.

The TRMC published the 2006 addendum to the 2005 Strategic Plan on August 25, 2006. The 2006 addendum identified potential impacts on the T&E infrastructure resulting from publication of the 2005 Base Realignment and Closure Commission (BRAC) Report, the 2005 Quadrennial Defense Review (QDR) and the Strategic Planning Guidance (SPG) Fiscal Years 2008-2013. It further reported on the status of three special T&E interest items: Miniature Flight Termination System (FTS), Nuclear Weapons Effects (NWE) Test Capability Gap, and Common Target Control System (TCS).

## 4.2 Test Resources

In addition to presenting Congress with a Strategic Plan, TRMC is also required to review the Services' and Defense Agency's budgets annually, and submit to the SecDef a report commenting on the proposed budgets, together with a certification that they are adequate to support the execution of the Strategic Plan. This is done annually in coordination with the USD(C). The certification of budget adequacy and balance correlates directly to the maturity and accuracy of the Strategic Plan, against which the TRMC assesses the budgets. The following criteria were the basis of the FY07 budget certification:

### **Adequacy criteria**

- T&E Infrastructure Investment Budgets: T&E infrastructure investment programs in the test capability areas contained in the Strategic Plan for the DoD T&E Resources, 26 September 2003, and the addendum to the Strategic Plan for the DoD T&E Resources, 23 June 2005, must have funds allocated in the proposed T&E budgets.
- T&E Operating Budgets: Operations of the test range infrastructure in support of testing must be funded to allow full compliance with the Financial Management Regulation (FMR), DoD 7000.14R, while sustaining current T&E infrastructure capabilities as established in the FY06 transfer of funding.

### **Balance criteria**

- Balanced: Greater than 80 percent of the needs contained in the Strategic Plan and associated addendum are addressed by test capability investment programs in the proposed T&E budgets.
- Balanced but Improvement Needed: Between 50 percent and 80 percent of the needs contained in the Strategic Plan and associated addendum are addressed by test capability investment programs in the proposed T&E budgets.
- Not Balanced: Less than 50 percent of the needs contained in the Strategic Plan and the associated addendum are addressed by test capability investment programs in the proposed T&E budgets.

The TRMC certified that the T&E infrastructure investment budgets were adequate and provided balanced support for the Strategic Plan in all test capability areas except "targets" (we call this "Targets and Threats"

- see Figure 4). The "targets" test capability area had addressed only one of the two primary needs identified. Therefore, it was rated as "balanced, but improvement needed." In addition, TRMC's review of the FY07 T&E operating budgets found them adequate.

In January 2006, the Director of TRMC certified that the proposed FY07 DoD T&E budgets were adequate and provided balanced support for the Strategic Plan in accordance with USC Title 10, Section 196(d).

**Assessments:** In the National Defense Authorization Act 2003, Congress passed Section 232 of Public Law 107-314 that directed the SecDef to ensure that, by FY06, the institutional and overhead costs of a facility or resource of a military department or defense agency within the MRTFB are fully funded from the major T&E accounts of the military department or defense

agency. Section 232 further directed that T&E facilities may only charge DoD customers for those costs that are "directly attributable to the use of the facility or resource for testing under a particular program." To implement the law, the OUSD(C) developed an MRTFB charge policy that provided strict compliance with Section 232. This revised charge policy was incorporated into the Financial Management Regulation (FMR), DoD 7000.14-R, Volume 11A, Chapter 12. Specifically, the charge policy defines direct costs as those costs that are directly attributable to the use of the facility or resource for testing under a particular program. Indirect or institutional costs, which are not to be charged to the DoD component users, are defined as the costs of maintaining, operating, upgrading, and modernizing the facility or resource.

As a result of the congressionally mandated change in charge policy and resultant change to the FMR, TRMC established a process for assessing the T&E rate structure, charges, and expenditures of the MRTFB to ensure compliance with the changes. This assessment process was developed with the involvement of MRTFB stakeholders including both field and headquarters participants, as well as OUSD(C) and DOT&E. The resultant methodology provides reasonable assurance of compliance with the updated MRTFB charge policy. Compliance assessments focus on four general areas: guidance, process, internal controls, and cost analysis; and they also provide for a discussion of any findings relating to charge policy procedures, problems, and compliance issues. Compliance assessments are not CFO-like audits yielding a qualified finding of fiscal accuracy. Rather, the intent of the assessment is to obtain reasonable assurance of compliance with the FMR charge policy—the instigation for which is the Director's annual budget certification requirement—without creating undue burden on the MRTFB sites. Any area of concern identified through the assessment process that we cannot clarify or correct on the spot through stakeholder discussions, or that results in substantial doubt as to FMR compliance, will result in the request for an external review.

The TRMC staff completed six compliance assessments in FY06: Arnold Engineering and Development Center, Aberdeen Test Center, Naval Air Warfare Center – Aircraft Division, White Sands Missile Range, 30<sup>th</sup> Space Wing, and Atlantic Undersea Test and Evaluation Center. Of the six completed assessments, none require further investigation by an external auditor. Of the compliance assessments that were completed two sites were identified to have areas of non-compliance that were deemed as not financially significant. The FY 06 assessment effort has provided TRMC with invaluable insight into the financial operations of the MRTFB sites. Additionally, the assessments have provided excellent lessons learned to share with the other MRTFB sites.

Four assessments are currently planned for FY07. They include the Air Force Flight Test Center, Joint Interoperability Test Center, Electronic Proving Ground, and Naval Air Warfare Center – Weapons Division. The TRMC will continue to conduct compliance assessments until each MRTFB is assessed, and will continually assess changes to the policies and procedures with respect to customer charges.

**Air Force Transformation Flight Plan FY07 Budget Change Proposal:** As a part of their FY07 budget submission, the Air Force chose to meet overall top-line budget reductions via "organizational and process efficiencies." Internal Air Force implementation policy, unknown during the FY07 Budget Certification process, was to meet these efficiency goals with

universally "aggressive reductions to contract support." Proposed reductions which would continue to increase through FY13 would result in a 25% reduction in contract-support funding lines. The Air Force Material Command's (AFMC) plan to implement these reductions resulted in a proposal to reduce and realign portions of the AFMC T&E infrastructure at Eglin AFB, Holloman AFB, Arnold Engineering Development Center, Edwards AFB, and the National Full-Scale Aerodynamic Complex (NFAC) at Moffat Field, all of which are part of the MRTFB regulated by DoDD 3200.11. The reductions in contract personnel for many of the T&E capabilities would translate into closure or divestiture, and consequently, not only in loss of capabilities and capacity, but also in reductions and relocations of military and government civilian personnel as well. TRMC performed a preliminary analysis and opposed the proposal suggesting that significant, additional analysis was required to substantiate the Air Force position. The TRMC drafted a proposed FY08 program change to add back the funding to the Air Force RDT&E appropriation to maintain these essential T&E resources until completion of the required analysis. Early in FY07, Air Force added sufficient funds to T&E accounts to permit certification of their budget. The Air Force has undertaken several studies (see below) to review their T&E infrastructure needs.

Congressional interest, primarily directed at the T&E infrastructures at Eglin AFB, Florida, and Holloman AFB, New Mexico, resulted in a number of communications from Congress to the DoD, and ultimately resulted in language in both the Conference Report for the FY07 NDAA and the FY07 Defense Appropriations Act for reports to Congress before implementing any reduction, divestiture, or realignment actions. Section 8110 of the Defense Appropriations Act requires the Secretary of the Air Force to submit to the congressional defense committees "a cost-benefit analysis of significant proposed realignments or closures of research and development or test and evaluation installations, activities, facilities, laboratories, units, functions, or capabilities of the Air Force," not later than March 31, 2007. "The analysis shall include an evaluation of missions served and alternatives considered and of the benefits, costs, risks, and other considerations associated with each such proposed realignment or closure." The TRMC will share their data with the Air Force and participate in the analysis.

The Conference Report for the FY07 NDAA requires two other reports from the DoD. One is to be a jointly prepared impact report from the Secretary of the Air Force and USD (AT&L) that affects eight designated impact areas of the Air Force proposal including personnel relocations and cost-benefit analysis from a DoD-wide perspective for the facilities proposed for closure or realignment. The TRMC is the lead office for USD(AT&L) to work with the Air Force for this report. The other report, also led by TRMC, will include an assessment of how the proposed closures or realignments of Air Force research, development, test, and evaluation activities may impact the strategic plan for the DoD test and evaluation resources, as required by section 196 of title 10, USC.

**The Program Assessment Rating Tool (PART):** The Office of Management and Budget (OMB), as a way to provide a consistent approach for objectively rating the effectiveness of federal government programs, developed PART. It is a component of the Budget and Performance Integration Initiative in the President's Management Agenda. OMB forwards the results of the PART to Congress, along with the annual budget submission.



In FY06, DoD designated T&E programs as one of ten programs to be subject to the PART process. Subsequent discussion among the Services, OUSD(C), TRMC, and DOT&E determined that the content of T&E programs would be only those T&E resources in the RDT&E appropriation, RDT&E Management Support Budget Activity. Roughly, the T&E PART covers Service/Component T&E infrastructure and the operational test activity performed by DOT&E. Since the majority of the T&E program involved test infrastructure and investment, over which TRMC has oversight responsibilities, TRMC was responsible for collating the information from and for the Services with OUSD(C) as the primary DoD-OMB liaison. DOT&E provided OMB direct input.

OMB's assessment of DoD T&E Programs in FY06 was "Results not Demonstrated." OMB found that T&E Programs generally deliver the required support to the development and user communities. They also note that recent re-organizations – specifically the creation of TRMC – support a Department-wide approach to T&E needs, promoting more efficient use of limited resources and the development of a Department-wide strategic plan. OMB's major finding, however, was that specific performance goals and measures required to track progress quantifiably were not currently available, but they note that TRMC is currently working towards developing these measures through the Strategic Plan for DoD T&E Resources.

Definition and documentation of performance metrics and goals in the Strategic Plan are key for a successful follow-on PART in FY07. In addition to developing metrics, TRMC will also begin collecting documentation of baseline metrics in support of improved performance and the designation of associated timeframes. After the initial PART evaluation, program goals and results will be updated annually.

### **4.3 Investment Programs**

**The Central Test and Evaluation Investment Program (CTEIP):** CTEIP was established in 1990 to improve the coordination and planning of investments in DoD's T&E facilities. The specific intent of the program is investment in developmental T&E capabilities that will meet the test requirements of more than one Service. This infrastructure must provide enhanced test capabilities that deliver more realistic and rigorous test scenarios, permit joint test and training, and promote continuous testing globally. With an average budget of \$124 million a year, CTEIP funds over 60 projects at any given time, all of which are in various stages of development. These projects range from quick assessments of new technologies to full-scale efforts to develop new test capabilities; the funding of which may be for as much as \$100 million over the life of the project. While CTEIP operates under the oversight of TRMC, the Services and Defense Agencies propose and execute the CTEIP projects. CTEIP provides a coordinated process for funding T&E investments that leverage Service investments and encourage joint development and use of new test capabilities.

During 2006, CTEIP made significant progress in the development and deployment of test infrastructure capabilities and assets. This year 25 Joint Improvement and Modernization (JIM) projects continued in execution, and a number of them successfully reached full operational capability (FOC) and were used in support of a myriad of test events across the MRTFB. In 2006, two of the capabilities provided by the Advanced Instrumentation Data and Control System project have reached FOC: the Pressure Sensitive Paint (PSP) capability in Arnold

Engineering Development Center's (AEDC) 16T aerodynamic wind tunnel and the Smart Pressure Sensor capability in AEDC's J1 and J2 turbine engine cells. The PSP capability is also available in a portable module that has supported testing outside of AEDC. Additionally, successful completion of the Electromagnetic Transients T&E Facility (EMTTEF) project met the need to test the effects of electromagnetic transients on systems and equipment. The overall success of the EMTTEF project in supporting T&E customers was due to the implementation approach that placed emphasis on starting support of T&E efforts immediately upon the reaching of initial operating capability (IOC) by each of the 10 development efforts comprised by the project. The first IOCs reached in March 2002 were the Horizontally Polarized Dipole Electromagnetic Pulse Simulator and the Lightning Waveform-A Simulator. Since then, as the other development efforts reached IOC, they have provided direct support for over 178 tests for the Navy, Marines, Army, and Defense Threat Reduction Agency. Also, the Littoral Warfare Environment, the centerpiece of the Land and Sea Vulnerability Test Capability project opened at Aberdeen Proving Ground, Maryland. This facility provides a full-scale controlled and dynamic representation of the littoral land and sea transition zone and includes both a wave generator and a reconfigurable beach environment. In 2007, CTEIP will continue to select projects that meet the program's purpose.

The Resource Enhancement Project (REP), the component of CTEIP that resolves short-term, emergent operational test shortfalls, had 16 subprojects in execution in 2006, 7 of which were new initiatives. REP achieved several successes during the fiscal year. To provide a threat-representative supersonic target that can more realistically simulate the anti-ship missile threat for Navy weapon systems, REP expanded maneuvering capabilities to the existing GQM-163A Supersonic Sea Skimming Target (SSST). The SSST Enhanced Maneuvering subproject modified the profile of the GQM-163A to allow it to perform a "Square Wave Maneuver," which is more representative of the abrupt, terminal-evasive maneuvers of which current anti-ship missiles are capable. This capability was demonstrated in the first quarter of FY06 when the enhanced GQM-163A made its first operational presentation for DDG-83 and DDG-97 in support of the SPY-1D(V) operational evaluation (OPEVAL). Four standard missiles engaged the GQM-163A while it flew at Mach 2.6, at 50 feet above the ocean. The Information Assurance Susceptibility Testing for Global Air Traffic Management (GMAT) subproject provided a capability for information assurance testing of the beyond-line-of-sight data link of the GMAT system. This capability reached FOC in 2006 in time to provide information assurance testing of the GMAT system installed in a C-5 aircraft. The Advanced Mine Simulation System (AMISS) subproject significantly improved the accuracy of mine susceptibility and survivability assessments of Navy platforms and mine warfare systems through the use of instrumented mine shapes that can be deployed in a tactical environment to collect and process influence signature data from a system under test. In August 2006, AMISS supported a Submarine Susceptibility and Vulnerability to Mines trial at the South Florida Testing Facility. All trial objectives were met and the number of runs (46) exceeded expectations.

In FY07, REP will fund 6 new initiatives. One initiative develops target sets that will have threat-representative radio-frequency emissions and millimeter wave radar cross-section characteristics to support testing of the Advanced Anti-Radiation Guided Missile weapon system. Another effort will provide ground-truth monitoring systems that detect, identify, and

interpret the message contents of highly complex digital signals. REP will also fund the development of a ground-truth instrumentation that can discriminate between bio-aerosol particles and other background particles by measuring the level of fluorescence aerosol particles in the environment.

**T&E/S&T:** T&E/S&T program funds advance development of test technologies to transition into the T&E infrastructure to verify the warfighting performance of our most advanced weapon systems. The primary customers of T&E/S&T technologies are CTEIP and Service and Defense Agency Improvement and Modernization Programs. The TRMC T&E/S&T program is aligned with the TRMC Strategic Plan for Defense T&E Resources, providing the technological feed to the overall T&E investment program.

Funded at \$23.2 million in FY06, T&E/S&T made significant progress in 55 projects in its 6 established focus areas: Directed Energy Test, Hypersonic Test, Multispectral Test, Net-Centric Systems Test, Non-intrusive Instrumentation, and Spectrum Efficient Technology. Key among the 28 FY06 new starts are technologies to improve our abilities to: 1) Measure high-energy laser and high-power microwave weapons (HPM) effectiveness; 2) Provide high-fidelity test environments for hypersonic systems; 3) Test multi-band target identification algorithms; 4) Test Joint net-centric warfare concepts using virtual equivalents of real-world networks; 5) Provide on-board wireless data communications for T&E; and 6) Use non-traditional frequency bands for telemetry. FY06 technology transitions and completions included: 1) Microwave Test Diagnostics for insertion into a HPM Sensor Suite to aid in determining HPM weapons effectiveness; 2) Survivable, embeddable hypersonic vehicle Heat Flux Sensors for determination of thermal and mechanical stability; 3) A Holographic Memory Cube capable of storing 0.75 terabytes of data in a shoebox-sized package with no moving parts; and 4) Technology to modify existing S-band (1.5-5.2 GHz) telemetry ground antennas to track a signal in the super high-frequency band (3-30 GHz) to allow use of additional areas of the spectrum for T&E. In FY07 the program, funded at \$39.7M, continues ongoing projects and is launching 27 new technology developments including technologies to: 1) Shield target missile flight termination systems from high-energy laser beams to protect the option of destroying an errant target missile in-flight; 2) Allow hypersonic testing under true flight profile, variable Mach 5-8 conditions; 3) Allow presentation of missile defense end-game scenarios that include high-intensity target signatures on cold backgrounds; 4) Validate methodologies for net-centric warfare simulation; and 5) Test unmanned autonomous, self-learning systems. The program expects to complete and transition up to 31 projects in FY07-08 and initiate 30-40 new S&T developments each year beginning in FY08 and beyond.

**Joint Mission Environment Test Capability (JMETC):** JMETC is a DoD corporate approach for linking distributed facilities, enabling customers to more rapidly develop and test warfighting capabilities in a joint context. In December 2005, the Program Decision Memorandum (PDM) II directed the stand-up of the JMETC program in FY07 under the USD(AT&L) with responsibility for execution assigned to the TRMC Director. PDM II provided funding at \$47.4M across FY07-11. Additionally, the PDM directed JMETC to demonstrate a prototype capability in FY06 and return for consideration of additional funding during Program Review 2008. The TRMC worked with Acquisition, Resources and Analysis (ARA) and Director of Defense Research Engineering (DDRE) in AT&L to obtain funding to support the FY06 activities. In an extremely short time frame, TRMC stood up an interim Program Office, planned and executed

prototype demonstrations, and developed a President's Budget Request-08 Issue Paper. In addition, the JMETC Program Office formed a JMETC Working Group and JMETC Senior Advisory Group (SAG). The Three-Star Programmers and JMETC SAG determined that the JMETC capability needed more time to mature and better define acquisition program requirements prior to increasing funding. However, they concurred with and supported the need for JMETC.

Within the last six months, JMETC completed four of five prototype demonstrations that proved the technical maturity of the baseline products, that core JMETC products can save time and money, showed compatibility with Joint National Training Capability (JNTC), and proved applicability across the spectrum of acquisition needs. To date, the JMETC demonstration events have not only met their objectives, but have demonstrated the capabilities of the JMETC baseline to effectively operate with other legacy solutions, like High-Level Assembly language (HLA), and to rapidly respond to changing event requirements. During the InterTec Spiral 1 demonstration event, early identification of interoperability anomalies among F-35, F-22, F-16, F-15, and CVN demonstrated benefits to acquisition programs. JMETC testing during InterTec Spiral 1 was a very significant event for the Air Force Flight Test Center since it was the first time they successfully tested net-centric operations using multiple types of aircraft in a large force exercise with both live and virtual players.

Based on discussions between the Joint Staff, DOT&E, and TRMC that there are many organizations and activities engaged in developing Live-Virtual-Constructive (LVC) infrastructure, it was proposed to initiate a LVC Testing Capabilities Based Assessment (CBA). The Joint Staff through the Joint Training FCB will take the lead in defining the scope and responsibilities for a LVC CBA, considering the training, testing, and acquisition domains.

As the JMETC program implements the direction in the *Testing in a Joint Environment Roadmap*, JMETC will provide the ability to lower the cost and speed the development of acquisition programs. It supports the acquisition community during program development, systems integration, developmental and operational testing, interoperability certification, and Net-Ready KPP compliance. JMETC will also support joint-mission portfolio testing such as, Single Integrated Air Picture, Theater Air Missile Defense, and Joint Battle Management Command and Control. In addition, it provides readily available connectivity to Service-unique distributed test capabilities (e.g., Navy DEP, AF-ICE, Army 3CE), and other Service and industry test resources. Without JMETC, each test will spend time and money re-establishing a LVC environment in a network configuration for their test. With JMETC, a distributed test integration capability and network stand ready to be quickly configured to meet the requirements for each test. This shortens the time to plan for a test and the money needed to build infrastructure for testing. During this coming year, the JMETC program will complete the one remaining prototype demonstration, stand up the JMETC program office, establish the JMETC virtual private network (VPN), and continue working with the T&E community to define products, services, and capability that JMETC can provide within the baseline funding. In addition, JMETC will provide customer support to the SIAP program and additional customers as funding allows.

#### 4.4 MRTFB Policy

To satisfy the congressional mandates that the TRMC Director "review and provide oversight of proposed DoD budgets and expenditures for T&E facilities and resources of the MRTFB," the TRMC, together with the Services and Defense Agencies, have instituted a comprehensive review of the policies and procedures governing the MRTFB.

**DoD Directive 3200.11 Update:** This update will replace the May 2002 version of DoD Directive 3200.11. It will reflect the decision to re-assign responsibility for providing policy, oversight and guidance for all matters related to the MRTFB from the DOT&E to USD(AT&L). The Directive will further assign the TRMC as the lead oversight agency for the MRTFB. Additionally, pursuant to Section 258 of the FY06 NDAA, it delegates authority to approve the changes to the composition of the MRTFB from SecDef to USD(AT&L), and complies with the new DepSecDef guidance on Directives.

The DoDD 3200.11 update has been informally coordinated within DoD. Formal review and staffing is in process. We anticipate publication in February 2007.

**DoD Instruction 3200.11 Update:** As a result of the DepSecDef guidance on Directives, the Instruction will be a new document. The purpose of this Instruction is to implement DoDD 3200.11, and to establish procedures for the operation, management, and oversight of the MRTFB. The TRMC staff has begun drafting the instruction, and anticipates issuance of the DoDI 3200.11 in April 2008.

#### 4.5 T&E Work Force Study

During FY06 TRMC led an important initiative to define and characterize the T&E workforce. Past assertions from other Defense acquisition related reports that improperly characterized the size of the T&E workforce, in part, prompted this effort. The focus of the FY06 effort began as an outgrowth of demographic analyses of the Department's Operational Test Agencies (OTAs) and evolved to include a profile of the MRTFB workforce. In addition, other T&E activities were included in the workforce definition in an attempt to identify those components directly involved in T&E work but outside of the MRTFB or OTAs. The TRMC shared the interim results of this initiative with the Defense Acquisition University to provide some input to their Human Capital Strategic Planning process. The demographics phase of the workforce effort is scheduled for completion in January 2007.

During FY07, TRMC intends to employ the results of the demographics analyses to develop selected T&E workforce shaping initiatives. At the August Infrastructure review, the Navy agreed to lead a joint service effort to examine possible opportunities to shape the T&E workforce. Recruiting, selection and retention, and education and training are some of the areas to be explored. The results will be briefed at the 2007 Infrastructure Review with recommendations for possible implementation.

## 4.6 Oversight

**Site Visits:** In addition to periodic visits from TRMC staff to review strategic planning and charge policy compliance, the Director led two major range visits. These visits are a semi-annual event and designed to: (1) keep apprised of range operations, and (2) show the range's personnel that their "health and welfare" are important to the DoD. This year's visits included one in November 2005 to Yuma Proving Ground, Naval Warfare Center-Weapons Division at China Lake, and to the Nevada Test and Training Range at Nellis AFB, and a second visit in April 2006 to the Naval Air Warfare Center-Weapons Division at Point Mugu, and a return visit to the Nevada Test and Training Range at Nellis AFB. During the visits, TRMC reviewed their test facilities, discussed problems facing the ranges, and explored possible courses of action to address the issues. In most cases, concerns centered on workload and funding. In addition, the Director traveled to the Air Force 46<sup>th</sup> Test Wing at Eglin AFB to review the impact of the Air Force's proposed restructuring of AF T&E.

**Test Week:** Another method of broadening communications among the T&E community as well as the acquisition community is the annual "Test Week" symposium sponsored by TRMC. This year's theme was "Meeting Tomorrow's Testing Challenges with Sweeping Changes and New Missions." This year's forum highlighted joint test technology challenges, international T&E capabilities, congressional perspective, and modernization plans for the MRTFB. Among the distinguished speakers were the Honorable Kenneth J. Krieg, USD(AT&L) from the acquisition community; the Honorable Lincoln Davis, US Representative, Tennessee 4<sup>th</sup> Congressional District; and Mr. George Rumford, TRMC, from the T&E community; and Mr. John E. (Jack) Krings, Mr. Clinton W. Kelly III, and Lt. Gen. (Ret.) Ronald Kadish from industry. In addition to the featured speakers, several panels addressed such varied topics as "Commercial Industry T&E: Comparisons and Contrasts;" "International T&E capabilities: A Look Offshore;" "The MRTFB: Opportunity for Reinvention;" "Supporting the Warfighter: Joint Infrastructure Enterprise Concepts;" and "The Customers Perspective: A Community Assessment of T&E Services."

How to describe the composition and membership of the MRTFB was a major discussion, and the TRMC will use the results to help form the issues the MRTFB re-engineering effort will address. One of the issues raised that requires TRMC attention is that the MRTFB funding policy, modified in the NDAA 2003 and that took effect in FY 2006, has had some adverse "unintended consequences." While intended to relieve cost burden of DoD acquisition programs for use of the MRTFB, it has decreased the flexibility of the test centers to accommodate unscheduled and schedule delays of programs, and programmatic investments. This, in conjunction with concerns by the training community of costs to use the MRTFB, will require the TRMC to work with the Comptroller's office over the next year to determine a solution. This issue was also topic of concern at the T&E Infrastructure Annual Review.

The TRMC again plans to host another test week in FY07. The theme will be "Making Test and Evaluation Relevant to the Joint Warfighter."



**Annual Review:** In August, TRMC held its inaugural T&E Infrastructure Review. This review provided a forum for MRTFB members to identify and discuss their most important concerns affecting the T&E infrastructure. More than 150 people, representing the entire MRTFB, Service communities, and defense agencies, participated in the event. The review was based on the results of a survey of the MRTFB developed by the TRMC which focused on the following topics: re-engineering the MRTFB through a revised DoD Directive 3200.11; Strategic Plan development; improving integration of test and training capabilities; ensuring an enduring, agile, multi-disciplinary T&E workforce; and test range encroachment. The survey results represent an informal baseline of the health of the MRTFB and exposed areas where we need more focused discussion. The review provided a forum for specific discussions with the Military Services and Defense Agencies on the MRTFB charge policy and the way forward for the MRTFB. Six key action items emerged from the executive session held on the last day of the review:

- identify the need for, and possible development of, an Urban Test Environment (Army lead)
- develop a set of metrics for measuring the status and growth of the MRTFB (Air Force lead)
- identify opportunities to improve the health of the T&E workforce (Navy lead)
- establish a study team to review the various interpretations of the FY03 National Defense Authorization Act charge policy for the ranges and facilities (TRMC Resources Division lead)
- develop a process for admission to and membership of a capability in the MRTFB (TRMC JIPP Division lead)
- review and recommend changes to reporting of anticipated user income in MRTFB budget exhibits USD, Comptroller (USD(C)) lead

Each of the assigned lead activities has developed a plan of action and milestones, and will begin executing the tasks in FY07. The activity leads will report results periodically and ultimately at the next annual T&E Infrastructure Review in the summer of 2007.

#### **4.7 NASA Collaboration**

In the Conference Report that accompanied the NDAA for FY05, the conferees directed the USD(AT&L) to identify and analyze aeronautics facilities managed by the NASA that DoD considers to be critical to the accomplishment of defense missions. The USD (AT&L) invited the affected DoD components to form a high-level team, which the TRMC Principal Deputy Director chaired, for the purpose of conducting the requisite analysis and identifying the critical facilities.

In FY06, the team evaluated nearly 90 NASA aeronautics facilities and conducted a needs-based assessment. Further analysis by the team resulted in the identification of 12 NASA aeronautics facilities considered to be critical to the defense mission. The team prepared a report for Congress that was ready for formal coordination by the end of the fiscal year.

NASA and DoD, two agencies with a long history of investment in aeronautics, have continued to work together in areas involving TRMC. DoD, under TRMC leadership, and NASA have agreed to pursue the development of a new interagency agreement, establishing a National Partnership for Aeronautical Testing. The intent of the new agreement is to replace a six-year old agreement for a National Aeronautical Test Alliance. A council that the Director of TRMC and NASA's Associate Administrator for the Aeronautics Research Mission Directorate co-chaired would manage the new partnership, with representation on the council from all of the affected DoD Components.

The TRMC and NASA also initiated a number of other actions during FY06, including a review of the nation's federally operated large and mid-size transonic aeronautical test facilities. Exploration of a reciprocal charge policy for the use of each other's aeronautical test facilities, and jointly hosting a conference with the managers and users of the nation's federally funded aeronautical test facilities are two other planned initiatives. Formal Approval of the agreement will be in FY07. TRMC and NASA personnel will lead the conference planning, working with industry trade associations, with the objective of holding the meeting in the spring of 2007.

#### **4.8 Modeling and Simulation**

Digital models and simulations are a key test and evaluation resource for the T&E community. During FY06, TRMC provided support to the Department's M&S community through active participation in both the Steering Committee and subordinate IPT.

The TRMC also initiated activity to co-lead the development of the T&E community's M&S business plan. The plan has two key objectives: (1) to identify the current and evolving needs for models and simulations used in support of T&E and; (2) identify actions needed to acquire and apply those M&S capabilities to meet those needs. The goal of this effort is to further enable the use of modeling and simulations throughout the T&E community in support of weapon systems acquisition.

The T&E community will continue its efforts to meet the objectives that will culminate in the completion of their business plan in FY07. The results from the T&E community will feed into the Department's overall M&S Cross-cutting business plan, and serve as input to TRMC strategic planning.

### **5. Test and Training Collaboration:**

In order to accomplish our mission, TRMC must not only provide guidance and oversight to the Services but lead in the collaboration across many fronts to materially improve the T&E infrastructure across DoD, and thereby increase the usefulness of T&E in supporting the acquisition process and the warfighter. The TRMC has initiated several efforts to increase outreach and collaboration between the test and training communities.

## **5.1 Range and Installation Sustainment**

The TRMC is formally engaged with the various DoD offices and forums that work to protect DoD facilities and ranges against diminution in mission capability as an unintended consequence of inordinately restrictive environmental laws and unchecked encroachment. This year TRMC gained a seat on the Sustainable Ranges Working Group, where a key focus area is seeking legislative relief from environmental-related laws that severely impinge on military readiness, especially where to minimize the resultant threat to the environment. The TRMC is also working with the appropriate Service T&E offices to employ a variety of tactics such as obtaining easements or investment in real property that precludes development in proximity to our installations. The TRMC has also supported the establishment of a Southeastern Regional Range Partnership whose purpose is to encourage Federal, state, and local agencies, and private entities to collaborate on agreements to manage local growth and mitigate its impact on area DoD installations and ranges. A similar effort for Western ranges is also being worked. This past summer TRMC staff conducted a survey of MRTFB related Range Encroachment issues. The survey identified the loss of RF spectrum as the most significantly debilitating issue. To mitigate the effects of spectrum encroachment, CTEIP is implementing a plan to: 1) Defend what is currently available for testing; 2) Develop technologies to mitigate the problems; and 3) Devise new ways of doing business. Another focus area for us has been our active participation in the ATL&L/I&E led Energy subgroup that is working with other Federal agencies to mitigate the impact of proposed new energy corridors, electric-generating windmill farms and new offshore oil exploration leases on, through, or near existing air, land and sea range spaces. During the summer of FY07, TRMC has agreed to help plan, sponsor, and partly fund the first biennial Conference on "Sustaining Military Readiness through conservation, compatible land use planning, and encroachment mitigation." The TRMC Director, along with his peers in OSD Readiness and the Installations & Environment offices, lead a senior-level panel to focus on future efforts.

## **5.2 Test and Training Planning Collaboration within OSD**

The TRMC is collaborating with the Deputy Under Secretary of Defense for Readiness (DUSD®) office on a number of key fronts. DUSD(R) appointed a representative to our T&E Strategic Planning Working Group to facilitate long range planning for common range modernization interests. In return, TRMC participates in the DUSD(R) Training Transformation Joint IPT that oversees planning for joint training infrastructure. To ensure common interests as identified in these or other forums can be collectively pursued, the CTEIP manager coordinated a Tri-signature memo signed late this summer by AT&L, P&R, and the acting DOT&E. It provides guidance to the Services on how planning for investments in common range capability needs should be corporately approached. It also proposes, that in FY07 the effort begins by first targeting the development of mutually suitable airborne instrumentation. This we will later expand to LVC Test and Training environments, and multi-level security.

### **5.3 MRTFB Training Support**

This past summer as part of our T&E Infrastructure Annual Review, TRMC conducted an initial survey of MRTFB support to training customers. The data, while incomplete, showed wide variances in the amount of time each member spent in this effort, and possible divergences in how members assess range charges. We will use the data gathered for focusing a second more detailed survey in FY07 related to the application and interpretation of the charge policy for training use of the MRTFB.

### **5.4 Collaboration with JFCOM**

The 2006-2008 DoD Priorities issued by the SecDef included as part of the need to strengthen U.S. Combined and Joint Warfighting Capabilities, direction to "implement joint national training, testing and experimentation." The test and training communities require similar capabilities for their respective missions. Within the training community, the JNTC, developed and managed by JFCOM has been at the core of Department efforts to implement Training Transformation. To facilitate closer collaboration between the testers and trainers, TRMC has established a liaison cell within the JNTC Joint Management Office. This direct link will facilitate communications and convergence in areas of investments, business practices, system assessments, and an interdependent approach to meeting warfighter needs. Included in this liaison cell is an expert in modeling and simulation responsible to assist JFCOM in the execution of many of the JMETC efforts. JFCOM has also appointed a full time senior staff member to act as their liaison to the test community. The TRMC is working closely with JFCOM to improve instrumentation, opposing forces equipment, LVC capabilities, communications technologies, and knowledge management tools. Some of the specific JFCOM efforts TRMC is collaborating on include: the Net-Enabled Command Capability (NECC) program, Information Operations (IO) Range, Joint Rapid Distributed Data Base Development Capability, and the Joint Advanced Training Technologies Laboratory. In addition, the JMETC program will provide the acquisition community a distributed LVC test capability similar to what JNTC provides for the training community. JMETC's decision to use the test-and-training enabling architecture (TENA)(common to both JMETC and JNTC provides compatibility between training and testing, enables streamlining of technical resources across test and training communities, and encourages the possibility of combined test and training exercises in the future. JFCOM is a member of TRMC JMETC SAG, and an active participant in our Joint Integrated Enterprise Initiative (JIEI). Additionally, TRMC and JFCOM are full partners in the development and configuration management of the TENA used throughout training and test organizations.

### **5.5 Joint Infrastructure Enterprise Initiative (JIEI)**

The purpose of JIEI is to bring together the DoD stakeholders who have interest in furthering the LVC Enterprise across the DoD. Representatives from the T&E, Training and Acquisition Communities of Interest (COI), the Services, and Joint Staff attend the meetings. The JIEI Forum Objectives are:

(1) Provide an understanding of ongoing LVC activities; (2) Discuss key issues affecting a more robust use of LVC environments; (3) Identify possible solutions to those issues along with possible courses of action.

In February 2006, the TRMC Director convened the first JIEI open forum. Since then, we have conducted five meetings with fifteen activities having made presentations.

The TRMC continues to challenge the participants to identify the key, cross-cutting issues facing the distributed LVC community that could be brought to a senior advisory group's attention. Issues identified from the first 5 JIEI meetings include multi-level and multi-national security issues; common data standards; standards for software products; information assurance guidelines; event accreditation and documentation; oversight structure and business models which enable more efficient cross-functional utilization of test and training ranges; and common funding issues and common network solutions.

In FY07, the forum will focus on acquisition programs where we expect to hear from such programs as CVN 21, FCS, JSF, MMA, and DDG1000, and learn the extent to which acquisition programs are developing and investing in distributed LVC capabilities. From this point, TRMC plans to condense and summarize the key, cross-cutting technical, governance, and budgetary challenges faced by the activities and distribute them to the appropriate forums for discussion and direction.

## **6. New FY 07 Initiatives**

### **6.1 Range Capability Directory (Inventory infrastructure)**

One key initiative planned for FY07 is development of a Range Capability Directory. The overall purpose of this effort is to establish a permanent corporate-level knowledge base that would provide a resource to both internal TRMC activities including policy, strategic planning, and budget certification, along with external customers who have need of such T&E infrastructure information.

Currently, multiple databases exist at different locations for data on T&E infrastructure costs, capabilities, and requirements. Often our mission requires repeated and sometimes inconvenient data "pulls" from the Services and other sources. The TRMC is undertaking the effort to build a single, shareable MRTFB database, which planners, resource analysts, budgeters, policy analysts, program managers, and engineers can share. The scope of this task includes development and maintenance of an inventory of existing and planned T&E capabilities and assets related to the MRTFB, non-DoD federal agencies, and eventually, the commercial sector. An end goal would be a web-accessible database that would allow TRMC and extended T&E customer base to survey a near real-time listing of available range locations, capabilities, and available workload capacity.

### **6.2 MRTFB Performance Metrics Development**

At the Annual T&E Infrastructure Review, Arnold Engineering Development Center's Chief Technologist presented an excellent briefing on the subject of performance measures. At the conclusion of the review the TRMC Director requested that the Arnold Engineering Development Center (AEDC) take the lead in developing performance measures for the MRTFB. AEDC has accepted the responsibility for leading the effort to develop a methodology

for a suite of performance measures for TRMC consideration to adapt for DoD-wide usage. In so doing, AEDC plans to coordinate closely with TRMC and use the Range Commanders Council in an advisory capacity.

The TRMC has plans to develop long-term performance measures, with associated target goals, together with specific annual-performance measures (with their own associated annual goals), in conjunction with the Strategic Plan for DoD T&E Resources. The intent of these performance measures is to provide a means to assess the adequacy of the MRTFB to meet current user requirements, as well as indicate where to make investments to ensure its viability to meet future user requirements.

## **7. Summary**

The SecDef as well as the commanders of all the unified commands have called for increasing the priority given to maintaining a robust T&E program, which requires healthy and vibrant test centers and ranges. This need for testing-- particularly capabilities conducted over very long distances --requires the Department to maintain and modernize highly instrumented ranges and to manage the challenges of range encroachment. This report captures the highlights of the numerous activities accomplished by the TRMC during FY06 to improve our test capabilities. During FY07, TRMC will continue to meet these challenges, championing the need for additional resources for T&E, as well as developing proposals to increase the ability of T&E to contribute to DoD's acquisition programs. We must upgrade essential capabilities to meet the challenges presented by the increasing technological sophistication of our weapon systems and new operational concepts associated with DoD transformation efforts. Adequate investments in the T&E infrastructure will greatly enhance the ability of the acquisition process to deliver adequately tested weapon systems to assure their effectiveness and utility for our warfighting forces.